

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
	)	
Promoting More Efficient Use of Spectrum	)	ET Docket No. 10-237
Through Dynamic Spectrum Use	)	
Technologies	)	
	)	

---

**REPLY COMMENTS**

---

March 28, 2011

1333 H Street  
Suite 700 West  
Washington, DC 20005  
(202) 452-7823



The Wireless Communications Association International, Inc. (“WCAI”), the trade association of the wireless broadband industry, submits these reply comments on the Commission’s Notice of Inquiry in this proceeding.<sup>1</sup>

## **I. EXECUTIVE SUMMARY**

WCAI supports the Commission’s efforts to promote efficient use of spectrum. Spectrum resources are a precious asset that should be utilized to the maximum extent possible for the benefit of consumers, public safety, and the federal government. In exploring dynamic sharing opportunities, the Commission should keep the paramount goals of spectrum management in mind: Avoiding harmful interference; maximizing spectral, technical, and economic efficiency; and maximizing investment.

These goals are already being met in the licensed mobile bands. The licensed mobile bands are heavily used and provide enormous economic value. Licensees in these bands are also deploying the latest, most spectrally efficient technologies available. These technologies are only getting better with the advent of new, heterogeneous network architectures that promise to deliver the fastest, most reliable wireless broadband services ever.

Mandating dynamic sharing in the licensed mobile bands would compromise the efficient use of these bands by reducing investment incentives, lowering spectral, technical, and economic efficiency, and potentially causing harmful interference. These results are particularly problematic in the licensed mobile bands because dynamic sharing offers few benefits for these bands. Licensees in the mobile bands are already

---

<sup>1</sup> Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies, *Notice of Inquiry*, FCC 10-198 (rel. Nov. 30, 2010) (“NOI”).

sharing their spectrum capacity by providing wholesale access to their networks, entering into MVNO relationships, and enabling M2M platforms. In short, the goals of dynamic sharing – efficient use of spectrum, additional access to spectrum capacity, significant investment and innovation, and rapid deployment of new networks and services – are already occurring in the licensed mobile bands.

The Commission should reject suggestions that it reallocate portions of the 2.5 GHz and AWS bands for unlicensed use. Proponents of dynamic access to these bands on an unlicensed basis have failed to substantiate their claims regarding the benefits of such a reallocation. They have also failed to measure the harm such action would cause to the ongoing deployment of new 3G and 4G broadband networks in these bands.

## **II. DISCUSSION**

### **A. If the Commission considers dynamic sharing, it should not extend its consideration to licensed mobile wireless bands.**

Dynamic spectrum access promises to “enable more efficient utilization of our nation’s precious spectrum resource.”<sup>2</sup> Nowhere is spectrum used more efficiently than in the mobile wireless bands. A frequently cited<sup>3</sup> study that made actual measurements of frequency use in Washington, DC, showed 100% use of the Part 22 Cellular and 2.5 GHz bands.<sup>4</sup> The mobile bands also produce more economic efficiency than any other

---

<sup>2</sup> NOI at ¶ 1.

<sup>3</sup> See, e.g., Comments of the Public Interest Spectrum Coalition, ET Docket No. 10-237 at n. 6 (filed Feb. 28, 2011) (“PISC Comments”) (citing Mark McHenry, “Dupont Circle Spectrum Utilization During Peak Hours, A Collaborative Effort of The New America Foundation and The Shared Spectrum Company,” New America Foundation Issue Brief (2003) (“McHenry Brief”) (available at <http://www.newamerica.net/files/archive/Doc File 183 1.pdf>).

<sup>4</sup> McHenry Brief at App. A.

spectrum band.<sup>5</sup> “As of the end of 2010, there were 302 million connected mobile devices, and the mobile wireless industry’s revenue totaled \$160 billion.<sup>6</sup> These statistics demonstrate the use consumers make of mobile wireless spectrum and how highly they value it. As the Public Interest Spectrum Coalition (“PISC”) noted in its comments, “frequency bands that are intensively and efficiently in use – such as the bands used for CMRS – are the least suitable candidates for spectrum band sharing.”<sup>7</sup> *All* mobile bands suitable for 4G deployment meet these criteria. Accordingly, the Commission should make clear that any consideration of dynamic spectrum sharing would not apply to mobile bands in which 4G networks are or will be deployed.

**i. Licensed mobile wireless bands already maximize efficient use of spectrum.**

Many commenters agree that spectrum in the mobile bands is already being used in a manner that maximizes spectral efficiency.<sup>8</sup> PISC, however, asserts that dynamic sharing on an unlicensed basis is necessary in the future for the efficient use of spectrum in heterogeneous networks. PISC argues that the business model of mobile providers is “not sustainable” with regard to new allocations of spectrum because (1) spectrum for new licensed mobile spectrum must be cleared, (2) there are limits to spectral efficiency and LTE is approaching those limits, and (3) there are limits to frequency reuse.<sup>9</sup> PISC

---

<sup>5</sup> “ECONOMIC EFFICIENCY occurs when all inputs are deployed in a way that generates the most value for consumers.” Spectrum Policy Task Force, Report of the Spectrum Efficiency Working Group at 6 (2002) (“SPTF Efficiency Report”) (available at [http://www.fcc.gov/sptf/files/SEWGFfinalReport\\_1.pdf](http://www.fcc.gov/sptf/files/SEWGFfinalReport_1.pdf)).

<sup>6</sup> See [http://files.ctia.org/pdf/CTIA\\_Survey\\_Year\\_End\\_2010\\_Graphics.pdf](http://files.ctia.org/pdf/CTIA_Survey_Year_End_2010_Graphics.pdf).

<sup>7</sup> PISC Comments at 28.

<sup>8</sup> See, e.g., Comments of AT&T, ET Docket No. 10-237 (filed Feb. 28, 2011) (“AT&T Comments”); Comments of CTIA, ET Docket No. 10-237 (filed Feb. 28, 2011) (“CTIA Comments”).

<sup>9</sup> PISC Comments at 6-10.

bases these assertions on the erroneous assumption that licensed mobile network design is stagnant and unable to develop heterogeneous networks.<sup>10</sup>

The fatal flaw in that assumption is that mobile providers are *already* deploying heterogeneous networks on both a licensed and unlicensed basis without dynamic sharing mandates. As PISC notes in its comments, AT&T has already deployed 24,000 unlicensed WiFi hotspots to offload portable traffic from its mobile network. In another example, Clearwire provides 4G and WiFi access in its devices and has deployed a licensed picocell underlay in Manhattan. Whether WiFi is used for offloading traffic (as in the AT&T and Clearwire examples) or licensed spectrum is used for deployment of a picocell underlay (as in the Clearwire example), innovative, heterogeneous networks are already here.

The innovations discussed above are only the beginning. The design of 4G heterogeneous networks is accelerating at a revolutionary pace. For example, Alcatel-Lucent has developed a modular, distributed architecture called “lightRadio” that does away with the notion of the dedicated, vertically integrated macrocell base station.<sup>11</sup> The radio antenna in this innovative architecture is based on a Rubik’s cube-sized box with an embedded antenna and power amplifier. These cubes can be stacked with other cubes like building blocks to create any type of cell site – from a macrocell to a picocell. An individual cube can be deployed separately and operates at only two watts.

Alcatel-Lucent’s lightRadio architecture has moved the baseband processing element into the cloud and separated it from the base station entirely. In this

---

<sup>10</sup> See PISC Comments at 10.

<sup>11</sup> See <http://connectedplanetonline.com/3g4g/news/MWC-Alcatel-Lucent-new-building-block-architecture-does-away-with-the-base-station-0207/index.html>.

configuration, baseband processing resources can be allocated to individual cells as needed to meet *dynamic* capacity demands. Because baseband processing is entirely uncoupled from individual cell sites (regardless of size), the antenna cubes (or even a single cube) become the only element deployed at the cell site. This heterogeneous architecture renders the terms macro, micro and pico obsolete by turning cell sites into a collection of cubes distributed in different configurations and densities throughout the network. Another vendor, Nokia Siemens Networks, just announced their new heterogeneous “Liquid Radio” architecture, which is similar to Alcatel-Lucent’s lightRadio.<sup>12</sup>

These new 4G heterogeneous network architectures are designed to maximize cell density and efficient spectrum reuse in licensed mobile bands using incredibly sophisticated technologies. There is currently no comparable design in the unlicensed environment, which currently lacks macrocell coverage and soft handover capabilities,<sup>13</sup> and there is no reason to believe that dynamic sharing in the licensed mobile bands on an unlicensed basis will accelerate the development and deployment of these and other heterogeneous networks. Unlicensed devices (whether used on a shared or unshared basis) are no better at promoting spectrum reuse than the licensed heterogeneous network architectures discussed above. The small form factor of Alcatel-Lucent’s Rubik’s cube-sized antennas allows them to be located anywhere a WiFi or other unlicensed device can go: on the sides of buildings, light poles, indoor walls, office desks, or the top of a tower.

---

<sup>12</sup> See <http://connectedplanetonline.com/3g4g/news/CTIA-Nokia-Siemens-pours-out-Liquid-Radio-0321/>.

<sup>13</sup> But see <http://www.springerlink.com/content/5w33618156376v82/>.

The ability to provision backhaul is indeed a delimiter of spectrum reuse. But mandatory dynamic sharing on an unlicensed basis coupled with “consumer-provisioned backhaul” would not be a silver bullet capable of killing the backhaul beast, as PISC suggests. Either way, consumer provisioned backhaul is a red herring. Whether service providers or consumers provision backhaul, backhaul deployment expenses are the same for both licensed and unlicensed networks. For example, Femtocells using licensed spectrum have been deployed on consumer’s desktops using consumer provisioned backhaul in the same way as an unlicensed WiFi modem, and in both cases consumers’ backhaul bills were the same. Backhaul is thus irrelevant in deciding whether to allocate spectrum on a licensed or unlicensed basis for dynamic sharing or otherwise.

Even if the costs of consumer provisioned backhaul were somehow different in an unlicensed rather than licensed environment, consumer provisioned backhaul still would be unable to provide a consumer-friendly solution for wireless backhaul deployment. A consumer provisioned backhaul connection is not provisioned by the consumer in the same sense as a commercially provided backhaul connection; a local cable company or a wired broadband alternative provisions the “consumer provisioned” connection to the consumer at retail. This means consumer provisioned backhaul is available only when a mobile subscriber is willing to pay for a wired connection *in addition* to their mobile service. For consumers that would rather not have a wired connection or cannot afford both mobile and wired services, consumer provisioned backhaul would be far more expensive and less efficient than a shared mobile backhaul resource provisioned by the mobile provider. Forcing consumers who have “cut the

cord” to buy their own backhaul connections at additional cost would also be anti-consumer.

It is also a red herring to argue that mandatory dynamic sharing on an unlicensed basis is necessary because the most advanced mobile technologies (e.g., LTE) are approaching the limits of spectral efficiency. Spectrum policies do not change the laws of physics. If radio engineers are bumping against the wall of physical impossibility, dynamic sharing on an unlicensed basis will not breach it.

Regarding band clearing, there are still many bands that can be made available for licensed mobile use on a flexible basis in a relatively short time frame. Clearing spectrum is always challenging, but new mechanisms like incentive auctions promise to make clearing easier. Although implementing incentive auctions will take time, there is no reason to believe that dynamic sharing on an unlicensed basis could be implemented any faster than spectrum bands could be cleared. Sharing spectrum with incumbent users on an unlicensed basis presents difficult interference issues that would be just as challenging to resolve as clearing licensed bands for flexible use. For example, the FCC first announced its intention to allow unlicensed sharing of the DTV white spaces in 2004,<sup>14</sup> and selected the necessary database administrators this year in 2011,<sup>15</sup> nearly seven years later. Whether the choice is band clearing or band sharing, new ways of using spectrum are always time-consuming to implement and dynamic sharing would be no different.

---

<sup>14</sup> See *Notice of Proposed Rule Making*, ET Docket Nos. 02-380 and 04-186 (2004).

<sup>15</sup> *Unlicensed Operation in the TV Broadcast Bands, Order*, DA 11-131 (2011).

The use of spectrum for unlicensed devices is valuable, and WCAI has advocated a balanced approach to the question of licensed and unlicensed allocations. But there is no evidence that dynamic sharing on an unlicensed basis would use spectrum more efficiently or increase the potential for spectrum reuse in the licensed mobile bands.

**ii. Sharing is already happening in licensed mobile wireless bands through wholesale, MVNO, and M2M relationships.**

Mandatory dynamic sharing arrangements are particularly unnecessary in the licensed mobile bands because licensed mobile service providers are already sharing their networks and spectrum voluntarily. Mobile service providers are increasingly providing third-party access to their spectrum resources through MVNO relationships. In the 2.5 GHz band, Clearwire provides access to the nation's first mobile 4G network on an MVNO basis to multiple service providers, including Sprint, Time Warner, and Comcast. In each of the 71 major markets where Clearwire has deployed its network, at least one of its MVNO customers also offers 4G service in competition to Clearwire. It also has innovative wholesale arrangements with Best Buy and CBeyond that market Clearwire's service under their own brands.

Sprint-Nextel too has numerous MVNO partners sharing its 3G network, including Clearwire, Cricket, and Boost Mobile. More recently, LightSquared has announced its plans to build a wholesale network and has already reached wholesale agreements with Best Buy and Leap Wireless. As noted in CTIA's comments, there are other types of sharing arrangements as well, such as M2M platforms and the Kindle e-reader. These secondary market transactions use efficient, market-based mechanisms to provide already many of the benefits predicted of dynamic sharing through. The plethora of commercially driven sharing arrangements in the mobile bands obviates any

need to layer on the additional complexity of a mandatory dynamic sharing regime in the mobile bands.

**iii. Mandating dynamic sharing in licensed mobile wireless bands would result in less efficient use of spectrum.**

As other commenters have already demonstrated, mandatory dynamic sharing would actually decrease spectral efficiency in licensed mobile bands.<sup>16</sup> The primary argument in favor of dynamic spectrum sharing is based on time and geography – that licensees are not transmitting on their spectrum continuously in every geographic area. Efficient use of spectrum involves more than a simple measurement of the amount of time a licensee transmits on a given frequency in a given area. For example, broadcasters typically transmit in their 6 MHz channels 24 hours per day, but that does not mean broadcasters’ use of the spectrum is spectrally (i.e., maximizing bits-per-hertz), technically (i.e., maximizing output at the lowest cost), or economically efficient (i.e., maximizing value for consumers)<sup>17</sup> – the three metrics the Commission has previously used to measure spectrum efficiency.<sup>18</sup>

The flexibly licensed spectrum model coupled with secondary markets provides mobile licensees with incentives to maximize the spectral, technical, and economic efficiency of their spectrum resources. “The creation of significant mandatory underlay rights would very likely reduce the incentives and ability of CMRS incumbent licensees

---

<sup>16</sup> See, generally, AT&T Comments; CTIA Comments.

<sup>17</sup> Mandatory use of the spectrum for over-the-air broadcasting is spectrally and economically inefficient. Broadcasters could use less spectrum to transmit their signals, and only a small percentage of consumers view video programming using the broadcaster’s radio transmission. The broadcasters use their radio spectrum licenses primarily to gain access to government subsidized must-carry rights, which is the real source of economic value in broadcasting.

<sup>18</sup> See, generally, SPTF Efficiency Report.

to innovate and invest.”<sup>19</sup> At the same time, “third parties [would] have no incentive to maximize the efficiency and value of the network as a whole nor [would] they have the ability to understand the ramifications of their spectrum usage on overall network performance.”<sup>20</sup> This combination of unintended consequences would lead to inefficient use of mobile spectrum by everyone.

WCAI agrees with Google that “[t]he benefits of utilizing market forces to encourage efficient spectrum management are compelling.”<sup>21</sup> To the extent the Commission desires to promote the use of dynamic sharing in the licensed mobile bands, it should continue to rely on market forces to maximize economic efficiency. For example, the Commission has already found that licensees have the authority to conduct dynamic spectrum auctions<sup>22</sup> as Google suggests.<sup>23</sup> The Commission’s rules allow other forms of dynamic spectrum access as well.<sup>24</sup> As other commenters have noted, there is no reason to grant an implied government subsidy to those who desire to access

---

<sup>19</sup> CTIA Comments at 12 (quoting Report of Michael L. Katz, “Don’t Let Short-Term Reforms Interfere with Long-Term Policy Goals” at 19 (Apr. 5, 2004) (*attached to* Comments of the Cellular Telecommunications & Internet Association, ET Docket No. 03-237 (filed Apr. 5, 2004))).

<sup>20</sup> AT&T Comments at 9. As a potential unintended consequence of these misaligned incentives, licensees may reduce their own networks’ spectral efficiency in order to harden their networks against the potential for interference caused by dynamic sharing. For example, a licensee may increase power in its own network beyond the level required in the absence of dynamic sharing.

<sup>21</sup> Comments of Google, ET Docket No. 10-237 at 9 (filed Feb. 28, 2011) (“Google Comments”).

<sup>22</sup> Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Second Report and Order*, FCC 07-132 at ¶ 241 (2007).

<sup>23</sup> Google Comments at 8-9.

<sup>24</sup> See *Secondary Markets Second Report and Order*, 19 FCC Rcd at 17546-48, ¶¶ 88-90 (explaining that “a variety of dynamic forms of spectrum leasing arrangements” are permitted, and providing a number of illustrative, but nonexhaustive, examples of permissible dynamic forms of spectrum leasing utilizing advanced technologies).

spectrum on a dynamic basis.<sup>25</sup> Those who wish to access spectrum using dynamic sharing techniques can simply “pay [their] own way,”<sup>26</sup> which would maximize their incentive to use the spectrum efficiently.

Of course, dynamic sharing in the mobile bands would provide no economic value at all for users who prefer certainty of access (e.g., enterprise customers).<sup>27</sup>

Opportunistic users have no control over how much spectrum a licensed mobile provider may be using at any given time, especially during peak periods when the spectrum may be used at 100% capacity.<sup>28</sup> As a result, service providers that rely on dynamic sharing could never assure consumers that the bandwidth they are paying for will be available to them when they need it. This is hardly a foundation for building reliable, high-quality wireless broadband service or maximizing economic efficiency.

Mandating unlicensed dynamic sharing in mobile bands would also harm the investment expectations of licensees and the expectations of consumers. Licensees have paid billions of dollars to build networks premised on an expectation of reliable, exclusive use. If those expectations were dashed, interest in future auctions would decline and investors would be less likely to back new licensed ventures.<sup>29</sup> Consumers have also invested their own capital buying mobile devices for use on reliable, licensed

---

<sup>25</sup> See AT&T Comments at 8.

<sup>26</sup> AT&T Comments at 8-9 (quoting Professors Gerald R. Faulhaber and David J. Farber, Comments of AT&T Inc., GN Docket Nos. 09-51, 09-157, Faulhaber & Faber Decl. at 21-22 (filed Sept. 30, 2009)).

<sup>27</sup> See Martin Cave, Chris Doyle, and William Webb, “Essentials of Modern Spectrum Management” at 19 (Cambridge Univ. Press 2007) (“Martin Cave”).

<sup>28</sup> It would be impossible for an opportunistic service provider to offer consumers notice of actual throughput.

<sup>29</sup> AT&T Comments at 16.

networks. To the extent dynamic sharing would lessen the reliability of the licensed network or lower its throughput, dynamic sharing would harm consumers as well. Those who would the share the spectrum dynamically, however, would bear none of these opportunity costs.

There is also no data in the record indicating that dynamic sharing is technically efficient (i.e., maximizes output at the least cost). The Commission has previously studied these issues as part of its Spectrum Policy Task Force and its rulemakings on cognitive radios and interference temperature. The Commission concluded in its cognitive radio docket that “many technical, cost, and business issues will need to be addressed in the marketplace before widespread deployment of [cognitive] radios may take place,” and rejected requests to consider a “radical paradigm shift.”<sup>30</sup> This remains the case today. “True cognitive radios are technically possible, but expensive,”<sup>31</sup> and it remains to be seen whether commercially reasonable (in price, form factor, and battery life) digital signal processors and microprocessors would be fast enough to perform the necessary signal processing to make software defined radios a reality.<sup>32</sup> There is also no evidence that anyone has solved the hidden terminal problem in the absence of

---

<sup>30</sup> Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies, *Report and Order*, 20 FCC Rcd 5486, 5487 (2005). The Commission subsequently terminated its “interference temperature” rulemaking: “Commenting parties generally argued that the interference temperature approach is not a workable concept and would result in increased interference in the frequency bands where it would be used. While there was some support in the record for adopting an interference temperature approach, no parties provided information on specific technical rules that we could adopt to implement it.” Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands, *Order*, 22 FCC Rcd 8938 (2007) (footnotes omitted).

<sup>31</sup> Martin Cave at 14.

<sup>32</sup> *Id.* at 15.

centralized management of a mobile band; and if the band must be centrally managed, the rationale for opportunistic use dissipates.<sup>33</sup>

The mobile bands are also unsuitable for dynamic sharing techniques from an interference perspective. To date, dynamic sharing techniques have primarily been ordered in bands that are used by incumbents only in specific geographic areas (i.e., radars in the 5 GHz band), or in bands in which the incumbents operate primarily fixed transmitters with known locations (i.e., the DTV white spaces). The mobile bands fit neither of these criteria: They are both heavily used and unpredictable.<sup>34</sup> Because mobile use is unpredictable, the database approach used in the DTV whitespaces would not work well. Sensing would not work well either, as the Commission found in the DTV white spaces proceeding. As testing of the potential for interference demonstrated in the DTV white spaces proceeding, current technology cannot support dynamic sharing in licensed mobile bands. Much more technical research and experimentation must be done before third party dynamic sharing would be feasible in the licensed mobile bands without causing harmful interference to incumbent users or drastically reducing their throughput.

**B. There is no evidence supporting the reallocation of licensed mobile spectrum to unlicensed use.**

Some commenters in this proceeding have asked the Commission to essentially reallocate a significant portion of the 2.5 GHz band from flexibly licensed mobile

---

<sup>33</sup> See *id.* at 18-19.

<sup>34</sup> AT&T Comments at 12-13.

spectrum to dynamic sharing on an unlicensed basis.<sup>35</sup> Mr. Grunwald asserts that the 2.5 GHz band should be reallocated for shared use because it “has been underutilized” and abuts the existing unlicensed allocation in the 2.4 GHz band.<sup>36</sup> He also claims that, “[b]ecause of their rapid turnover, networks that use unlicensed spectrum are most likely to adopt novel spectrum management techniques.”<sup>37</sup> Other commenters suggest that the AWS band is underutilized and could be used for dynamic sharing.<sup>38</sup> No evidence is submitted to support these claims, and in any event, each of these claims is irrelevant, unnecessarily disruptive, or internally contradictory.

Mr. Grunwald’s assertion that the 2.5 GHz band has been underutilized in the past is irrelevant to future allocation decisions within the band. Its historical underutilization is exactly why the Commission completed a complicated rebanding proceeding in 2006 to transition the band from a command and control model to a flexibly licensed model.<sup>39</sup> As a result, significant investment and new broadband deployment in the band has only

---

<sup>35</sup> Comments of Dick Grunwald, ET Docket No. 10-237 (filed Feb. 2011) (“Grunwald Comments”); Comments of Microsoft, ET Docket No. 10-237 (filed Feb. 28, 2011) (“Microsoft Comments”).

<sup>36</sup> Grunwald Comments at 33.

<sup>37</sup> *Id.* at 31. This unlicensed innovation canard is completely unsubstantiated. Mr. Grunwald provides no evidence that consumers throw away their laptops with built in WiFi chips any faster than they throw away their mobile phones. Nor does he engage in any analysis of actual upgrade cycles for mobile base stations and unlicensed access points.

<sup>38</sup> PISC Comments at 23.

<sup>39</sup> See Amendment of Parts 1, 21, 73, 74 and 101 of the Commission’s Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Order on Reconsideration and Fifth Memorandum Opinion and Order and Third Memorandum Opinion and Order and Second Report and Order*, FCC 06-46 (2006).

just begun to realize its full potential. The AWS band was also rebanded in 2006 and is likewise in transition.<sup>40</sup>

Mr. Grunwald does not acknowledge that Clearwire and other licensees in the newly rebanded 2.5 GHz band are currently deploying the first 4G networks in the U.S., and that 3G/4G networks are being deployed in the AWS band. Nor do he and other commenters acknowledge that the 2.5 GHz and AWS bands have not yet reached their substantial service deadlines, which renders it premature to evaluate whether the bands are being underutilized. Making yet another radical change to these bands within only a few years of their complete rebanding would jeopardize ongoing 3G and 4G network builds in these bands by upsetting the expectations of investors, licensees, consumers, and the entire premise of the Commission's flexible licensing approach. Past is not prologue in the 2.5 GHz or AWS bands.

Mr. Grunwald's claim that spectrum bands abutting current unlicensed allocations are the best targets for opportunistic spectrum use<sup>41</sup> is contradicted by two other statements in his comments: that unlicensed networks are more likely to innovate and new radio technologies can use noncontiguous spectrum bands.<sup>42</sup> If Mr. Grunwald were right that unlicensed networks innovate faster and new radios are capable of using noncontiguous spectrum, then it would seem unnecessary to throw the 2.5 GHz band into disarray merely to add contiguous spectrum to the 2.4 GHz band. Highly innovative

---

<sup>40</sup> See Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, *Ninth Report and Order and Order*, FCC 06-45 (2006).

<sup>41</sup> Grunwald Comments at 2-3.

<sup>42</sup> Grunwald Comments at 2.

unlicensed networks would instead use channel bonding or other techniques to combine multiple, non-contiguous spectrum bands.

Mr. Grunwald also asserts that, because the 2.5 GHz band is contiguous with the 2.4 GHz band, the cost of unlicensed networks in the 2.5 GHz band would be reduced because only slight modifications of 2.4 GHz radios would be required. That may be true, insofar as it goes, but Mr. Grunwald does not consider the international implications of this assertion. The market for broadband infrastructure is a global market that relies heavily on economies of scope and scale. This global market was one of the primary drivers of the widespread adoption of 2.4 GHz WiFi technologies. Because the 2.4 GHz band was allocated for ISM internationally, manufacturers were willing to embed 2.4 GHz WiFi radios into laptop and mobile chipsets that could be marketed globally, which resulted in tremendous economies of scale. In contrast, the 2.5 GHz band has been allocated for licensed mobile use in Europe and South America and primarily for satellite services in India and Asia. Mr. Grunwald's proposal would thus create a U.S.-only allocation that would not enjoy the international economies of scale present in the 2.4 GHz band. At the same time, it would thwart the ability of 2.5 GHz licensees in the U.S. to take advantage of Europe's use of the 2.5 GHz band for licensed mobile services. If Mr. Grunwald's proposal will not scale, there is little benefit in the adjacency of the 2.4 and 2.5 GHz bands.

Mr. Grunwald is barking up the wrong tree. No one has made the case that there is so little spectrum available for unlicensed devices that they must be able to access the licensed mobile bands. As AT&T pointed out in its comments, "[t]he spectrum resources currently available for unlicensed and non-exclusive uses dwarf the amount of spectrum

dedicated for licensed mobile services, and the Commission should focus first on these opportunities.”<sup>43</sup> WCAI agrees.

### **III. CONCLUSION**

WCAI respectfully asks that the Commission include the arguments in this pleading, if the Commission issues a Notice of Proposed Rulemaking in this proceeding.

Respectfully submitted,

Wireless Communications Association  
International, Inc.

By:       /s/      Fred Campbell

Fred B. Campbell, Jr.  
President & CEO  
1333 H Street, NW, Suite 700 West  
Washington, DC 20005  
202.452.7823

March 28, 2011

---

<sup>43</sup> AT&T Comments at ii.